National Institute of Environmental Health Sciences

Environmental prediction, risk assessment and extreme events: Adaptation strategies for the developing world

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Abstract:

The uncertainty associated with predicting extreme weather events has serious implications for the developing world, owing to the greater societal vulnerability to such events. Continual exposure to unanticipated extreme events is a contributing factor for the descent into perpetual and structural rural poverty. We provide two examples of how probabilistic environmental prediction of extreme weather events can support dynamic adaptation. In the current climate era, we describe how short-term flood forecasts have been developed and implemented in Bangladesh. Forecasts of impending floods with horizons of 10 days are used to change agricultural practices and planning, store food and household items and evacuate those in peril. For the first time in Bangladesh, floods were anticipated in 2007 and 2008, with broad actions taking place in advance of the floods, grossing agricultural and household savings measured in units of annual income.We argue that probabilistic environmental forecasts disseminated to an informed user community can reduce poverty caused by exposure to unanticipated extreme events. Second, it is also realized that not all decisions in the future can be made at the village level and that grand plans for water resource management require extensive planning and funding. Based on imperfect models and scenarios of economic and population growth, we further suggest that flood frequency and intensity will increase in the Ganges, Brahmaputra and Yangtze catchments as greenhouse-gas concentrations increase. However, irrespective of the climate-change scenario chosen, the availability of fresh water in the latter half of the twenty-first century seems to be dominated by population increases that far outweigh climate-change effects. Paradoxically, fresh water availability may become more critical if there is no climate change. This journal is © 2011 The Royal Society.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A1, SRES A2, SRES B1, SRES B2

Communication:

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience:

audience to whom the resource is directed

Policymaker

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Extreme Weather Event, Food/Water Security

Extreme Weather Event: Flooding

Geographic Feature:

resource focuses on specific type of geography

Freshwater, Rural

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Country

Other Asian Country: Bangladesh

Health Impact:

specification of health effect or disease related to climate change exposure

Injury

Intervention:

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Low Socioeconomic Status

Resource Type: ☑

format or standard characteristic of resource

Research Article

Resilience: ☑

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale: ☑

time period studied

Short-Term (

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content